User's Manual

SOUND-INSULATED FAN

KSB

CONTENTS

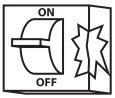
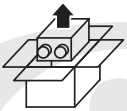
SAFETY REQUIREMENTS;

- Read this User's Manual carefully prior to the operation and installation of the duct fan (hereinafter «Fan»).
- Installation and operation of the fan shall be performed in accordance with the present User's Operation Manual as well as the provisions of all the applicable local and national construction, electrical and technical codes and standards.
- The warnings contained in the present User's Manual must be considered most seriously since they contain vital personal safety information.
- Failure to follow the safety regulations may result in an injury or fan damage.
- Upon familiarization keep the User's Manual for the entire service life of the fan.
- While transferring equipment control the User's Manual must be turned over to the receiving operator.

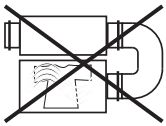
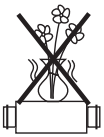
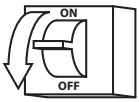
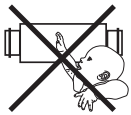
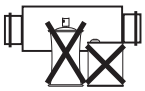
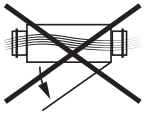
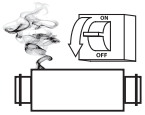
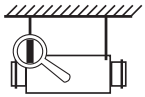
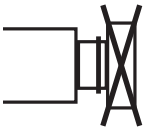
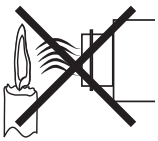
The symbols used in the present User's Manual have the following meaning:

	**ATTENTION!**
	**RESTRICTED!**

FAN INSTALLATION SAFETY PRECAUTIONS

	The fan must be disconnected from the power mains prior to every installation or repair operation.		The fan must be grounded!
	The fan must not be operated outside the temperature envelope stated in the User's Manual or in aggressive or explosive environments.		Do not use damaged equipment or conductors to connect the fan to the power mains.
	While installing the fan follow the safety regulations specific to the use of power tools.		Unpack the fan with care.
	Do not change the power cord length at you own discretion. Do not bend the power cord. Avoid damaging the power cord.		Do not position any heating devices or other equipment in close proximity to the fan power cord.

FAN OPERATION SAFETY PRECAUTIONS

	Do not touch the regulator or the control panel with wet hands. Do not carry out fan maintenance with wet hands.		Do not wash the fan with water. Avoid penetration of water onto the electric parts of the fan.
	Use the fan only as intended by the manufacturer. Do not connect any drying machines or other similar equipment to the fan or the ventilation circuit.		Do not put any water containers (e.g. vases etc.) on top of the fan.
	Do not sit on the fan or put any foreign objects on top of the fan.		Disconnect the fan from the power mains prior to any technical maintenance.
	Do not let children operate the Fan.		Keep the power cord intact while operating the fan. Do not put any foreign objects on top of the power cord.
	Do not store any flammable gases or highly flammable substances in close proximity to the fan.		Do not open the fan during its operation.
	Should the fan generate any unusual sounds, smells or smoke disconnect it from the power mains and contact the service centre.		Check the fan for secure installation from time to time in case of prolonged operation.
	Do not block the air duct while the fan is working.		Do not direct the air flow generated by the fan onto combustion equipment or burning candles.

INTRODUCTION

The present User's Manual contains the technical details, operating instructions, technical specification as well as the installation and mounting instructions specific to VENTS KSB Sound-Insulated Fan (hereinafter «Fan»).

USE

The fan is intended for supply and exhaust ventilation of household, public and industrial spaces with stringent noise emissions restrictions and confined installation space. The fan is designed for round air duct systems.

The units allow continuous operation without disconnection from the power mains.

The fan is a component unit and is not designed for autonomous operation.

The air being handled must not contain any combustible or explosive mixtures, chemical fumes, coarse dust, soot, fat or any environment prolific for the formation of harmful substances (toxic substances, dust and pathogens) as well as sticky substances and fibrous materials.

THE FAN IS NOT INTENDED FOR OPERATION BY CHILDREN OR ANY PERSONS WITH LIMITED SENSORY OR MENTAL CAPACITY AS WELL PERSONS LACKING THE REQUIRED TRAINING. THE FAN MUST BE HANDLED ONLY BY PROPERLY QUALIFIED PERSONNEL AFTER THE APPROPRIATE SAFETY BRIEFING. THE CHOICE OF FAN INSTALLATION LOCATION MUST PREVENT UNAUTHORIZED ACCESS BY UNATTENDED CHILDREN.

DELIVERY SET

- Fan - 1 piece;
- User's Manual - 1 piece;
- Shipping Box - 1 piece.

DESIGNATION KEY

KSB XXX X X XXX X

Power Cord
_ - equipped with a junction box;
R - equipped with a power cord with IEC C14 plug;
R1 - equipped with a power cord with a wall socket plug (depending on the country of intended use)

Temperature and speed controller availability
U - electronic temperature-controlled module, temperature sensor in the fan duct;
Un - electronic temperature-controlled module, remote-position temperature sensor;
U1 - electronic time-controlled module, temperature sensor in the fan duct;
U1n - electronic time-controlled module, remote-position temperature sensor.

Motor on vibration mounts
M

High-performance motor
S

Fitting Diameter
100, 125, 150, 160, 200, 250, 315

Unit Designation
KSB

TECHNICAL SPECIFICATIONS

The fan is designed for operation in an enclosed area at ambient temperatures from -25 ºC to + 55 ºC at relative humidity of up to 80% (at +25 ºC).

The unit meets the requirements of IPX4 hazardous parts access and water ingress protection standard.

The main outside and connecting dimensions as well as the appearance and technical parameters of the unit are given on Figure 1 and in Tables 1 and 2.

The fan undergoes continuous improvement - therefore, some models may slightly differ from the ones described herein.

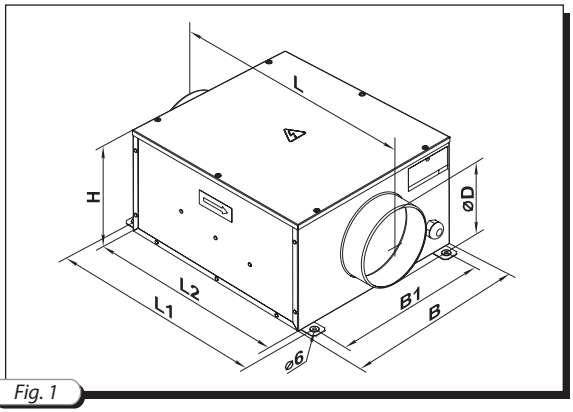


Fig. 1

Table 1

Type	Dimensions [mm]							Масса, кг
	ØD	B	B1	H	L	L1	L2	
KSB 100	99	322	280	192	447	380	350	5,4
KSB 125	124	322	280	192	447	380	350	5,4
KSB 150	149	352	310	212	477	410	380	6,4
KSB 160	159	352	310	212	477	410	380	6,4
KSB 200	199	432	368	287	588	506	480	10,0
KSB 200S	199	432	368	287	588	506	480	12,0
KSB 250	249	432	368	287	588	506	480	12,5
KSB 315	314	502	438	397	648	566	540	15,5

Table 2

Type	Supply Voltage, 50 Hz [V]	Power Consumption [W]	Current [A]	Max. Air Flow [m^3/h]	Rotation speed [min^{-1}]	Sound Pressure Level at 3m. [dB(A)]	Max. transported air temperature [°C]	Protection rate
KSB 100	230	73	0,32	240	2560	33	-22 +55	IP X4
KSB 125		73	0,32	330	2590	35	-22 +55	
KSB 150		72	0,32	420	2600	36	-22 +55	
KSB 160		75	0,33	420	2690	36	-22 +55	
KSB 200		103	0,45	730	2550	38	-22 +55	
KSB 200S		195	0,85	950	2570	41	-22 +45	
KSB 250		198	0,87	1300	2420	41	-22 +55	
KSB 315		322	1,40	2150	2670	43	-22 +45	

DESIGN AND OPERATING LOGIC

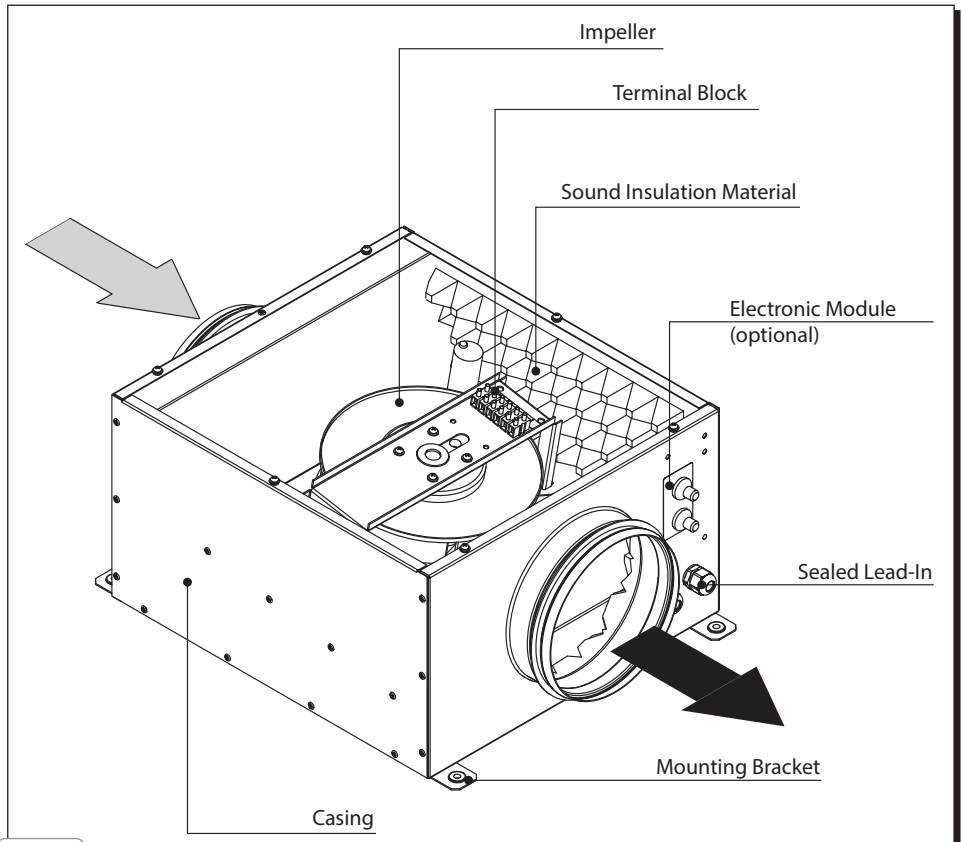


Fig. 2

The fan casing is made of galvanized steel sheets with additional thermal and sound-insulation layers. The round fittings are equipped with rubber gaskets (see Fig. 2).

The fan is equipped with a bipolar asynchronous motor with an external rotor and a centrifugal impeller with backward-curved blades. The motor is equipped with built-in thermal protection enabling its automatic restarting. The motor utilizes ball bearings with a specially selected lubricant which drastically reduce the fan noise and ensure maintenance-free operation. To further reduce the noise resulting from the fan vibration the motor can be mounted on rubber vibration mounts (KSB...M).

There is also a higher performance motor option (KSB…S) available for select standard sizes.

INSTALLATION AND SETUP

Duct fans are intended for installation into round air ducts. The fans are installed into air duct splits.

The casing has mounting brackets to ensure optimum placement of the fan.

In case the fan is mounted on flexible joints attach the fan to the structural unit by means of supports, suspension links or brackets.

The fan may be installed in any position in consideration of the air flow direction (as indicated by the arrow on the fan casing).

To reduce the aerodynamic drag resulting from the air flow turbulence provide for a straight section equal to 1 air duct diameter on the fan intake side and one equal to 3 air duct diameters on the fan exhaust side. The said sections must be free of any filters or other devices.

Make sure to arrange unimpeded access for the fan maintenance.

Having unpacked the fan and prior to installation:

- Carefully read the instructions specific to the fan installation, operation and maintenance;
- Check the fan for integrity and signs of transit damage.

Follow the safety regulations during the make-ready procedures and fan operation.

The fan installation procedure is as follows:

- Make sure that the motor is de-energized (see Fig. 3.1);
- Apply the markings for mounting the brackets onto the structural surface (unit) (see Fig. 3.2);
- Drill the holes and fasten the fan on the brackets by using appropriate fasteners (e.g. expansion bolts) (see Fig. 3.3);
- Connect the ducts to the fan (see Fig. 3.4).

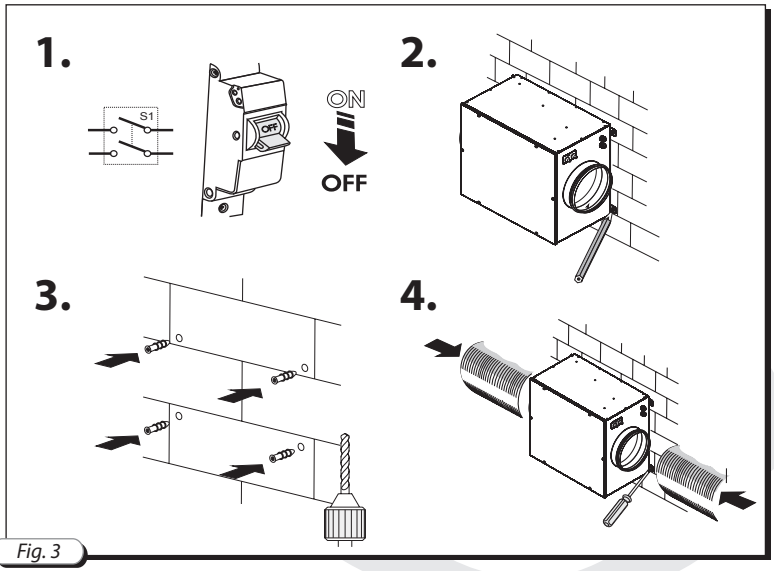


Fig. 3

CONNECTION TO POWER MAINS

THE FAN MUST BE CONNECTED TO THE POWER MAINS ONLY BY QUALIFIED PERSONS HAVING BEEN MADE FAMILIAR WITH THE PRESENT OPERATION MANUAL. THE UNIT IS INTENDED FOR CONNECTION TO AC MAINS SUPPLYING THE VOLTAGE COMPLIANT WITH THE TECHNICAL SPECIFICATION CHART. CHECK THE ENTIRE POWER CORD LENGTH FOR CHOKING. DO NOT SWITCH ON THE UNIT IF THE POWER CORD IS DAMAGED. DISCONNECT THE FAN FROM THE POWER SUPPLY PRIOR TO ANY WORK ON THE UNIT! THE NOMINAL ELECTRICAL PARAMETERS OF THE UNIT ARE GIVEN ON THE MANUFACTURER'S LABEL. ANY TAMPERING WITH THE INTERNAL CONNECTIONS IS PROHIBITED AND WILL VOID THE WARRANTY.

The fan is intended for connection to a single-phase 230 V/50 Hz AC mains.

Depending on the configuration there are two possible options for fan connection to the power mains:

- via the plugged power cord;
- via the junction box.

The fan connections (cables and wires) must be durable, insulated and heat-resistant. The external lead-in must be equipped with an automatic cutout switch built into the stationary wiring to disconnect all the power mains phases. The external switch position must ensure free access for quick power-off of the unit.

The recommended automatic switch nominal current is 2 A for for KSB 315 and 1 A for all other modifications. The recommended minimum conductor section is 0.75 mm^2. The conductor selection shall be based on the maximum permissible wire heating depending on the wire type, its insulation, length and installation method (i.e. overhead, in pipes or inside the walls).

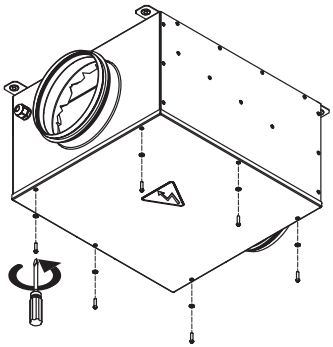
The power mains connection steps are as follows:

1. Internal fan connections:

- Undo the screws securing the upper casing panel (see Fig. 4.1);
- Remove the upper panel (see Fig. 4.2);
- Run the power supply cable through the sealed lead in the side wall; Strip the wire tips to 7 - 8 mm;
- Connect the wires to the terminal block in accordance with the electrical connections diagram and the terminal markings (see Fig. 5). To do this insert the wires into the respective terminals until the insulation stops against the metal part and secure the wires with clamping screws;
- Assemble the fan.

2. Connection via the junction box.

In case of the fan connection to the power mains via the junction box the connection diagram and the terminal markings also apply (see Fig. 5).



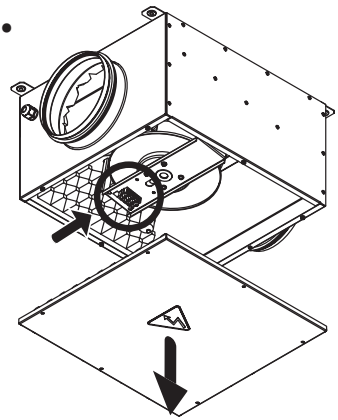
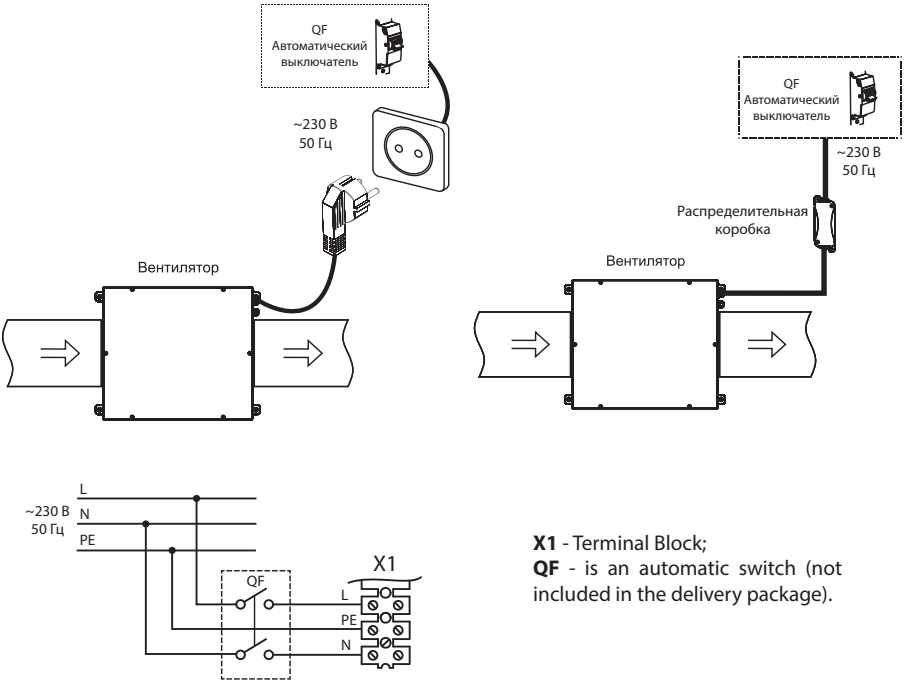


Fig. 4



X1 - Terminal Block;
QF - is an automatic switch (not included in the delivery package).

Fig. 5

CONTROL

Depending on the configuration the fan may be equipped with an electronic temperature and speed control module (see Fig. 6).

KSB fan is a perfect solution for ventilation systems for premises which require air temperature control (i.e. greenhouses). The fan equipped with the electronic temperature and speed control module automatically changes the impeller speed (air flow rate) relative to the temperature in the ventilation duct or on the premises.

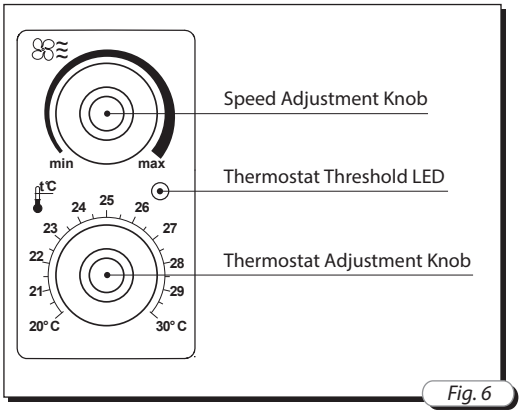


Fig. 6

The front panel of the electronic module has the following controls and indicators:

- Impeller speed pre-set knob;
- Electronic thermostat operating threshold knob;
- Thermostat operation indicator.

The fan is available in two variants:

- with a temperature sensor built into the fan duct («U»/»U1» option);
- with a remote-position temperature sensor attached to a 4 m long cable («Un»/U1n» option).

The operation algorithm of KSB fans equipped with the electronic temperature and speed control module is as follows:

Set the desired air temperature (thermostat operating threshold) by turning the thermostat adjustment knob and the minimum rotation speed (air flow rate) by turning the speed adjustment knob. If the temperature increases above the pre-set thermostat operating threshold the automatic circuit will switch the fan to maximum rotation speed (maximum air flow rate). If the temperature decreases below the pre-set thermostat operating threshold the automatic circuit will switch the fan to the previously set rotation speed.

The operation algorithm includes a speed switching delay preventing frequent switching of the motor speed in case the duct temperature remains at the threshold value. Depending on the case the following two delay algorithms are applied:

- **1. Temperature sensor feedback delay («U» option):**

Upon the air temperature increasing by 2 °C above the pre-set thermostat operating threshold the fan will switch to a higher speed. The fan will switch to the pre-set (low) speed upon the temperature decreasing below the pre-set temperature threshold. This algorithm is used to maintain the air temperature with a 2 °C accuracy. The fan speed is switched at reasonably frequent intervals.

- **2. Timer feedback delay (KSB…U1).**

Upon the air temperature increasing above the pre-set thermostat operating threshold the fan will switch to a higher speed with simultaneous activation of the 5 minute delay timer. The fan will then switch to the pre-set (lower) speed upon the temperature decreasing below the pre-set temperature threshold only upon elapsing of the 5 minute timer providing for the delay.

The above algorithm is used to precisely maintain the air temperature as desired. Compared to the U option

algorithm the U1 fan speed is switched more frequently with a 5 minute minimum period for maintaining each speed.

Example of Temperature Sensor Feedback Delay.

Initial Conditions:

- Rotation speed = 60 % of the maximum;
- Operation threshold = +25 °C;
- Air duct temperature = +20 °C.

Fan impeller rotation speed = 60 %

Air duct temperature increases
Fan impeller rotation speed = 60 %

Air duct temperature reaches +27 °C
Fan switches to impeller rotation speed = 100 %

Air duct temperature starts falling
Fan impeller rotation speed = 100 %

Air duct temperature reaches 25 °C
The fan switches to the previously selected rotation speed (= 60 %).

Timer Feedback Delay Example.

Initial Conditions:

- Rotation speed = 60 % of the maximum;
- Operation threshold = +25 °C;
- Air duct temperature = +20 °C.

Fan impeller rotation speed = 60 %

Air duct temperature increases, reaches +25°C and continues to grow;

The fan switches to impeller rotation speed = 100 % with simultaneous activation of the 5 minute timer;

Air duct temperature starts falling;
Fan operates at impeller rotation speed = 100 %

Air duct temperature reaches +25 °C and continues to drop;
Fan runs until the timer elapses and then switches to the previously selected rotation speed (= 60 %). After switching to the previously selected speed (= 60 %) the 5 minute timer will activate again;

Air duct temperature increases, reaches +25°C and continues to grow;
Fan runs until the timer elapses and then switches to impeller rotation speed =100% (with simultaneous activation of the 5 minute timer).

In other words while following the timed delay algorithm the delay timer will activate on each switching of the fan speed.

TECHNICAL MAINTENANCE

The technical maintenance and repair of the fan may commence only after its disconnection from the power mains and all the rotating parts coming to a complete halt.

The technical maintenance includes periodic cleaning of the surfaces from accumulated dust and dirt.

The impeller blades require thorough cleaning every 6 months.

To clean the blades:

- Disconnect the fan from the power mains;
- Wipe the exterior surfaces of the fan casing (see Fig. 7.1);
- Undo the screws and remove the upper fan panel (see Fig. 7.2 and 7.3);
- Clean the impeller blades using a soft brush or compressed air (see Fig. 7.4).

Avoid penetration of liquid onto the electric motor and inside the electronic equipment bay. Blade cleaning must be approached with caution so as not to displace the balancing weights of the impeller wheel.

Upon cleaning perform all the above operations in the reverse order.

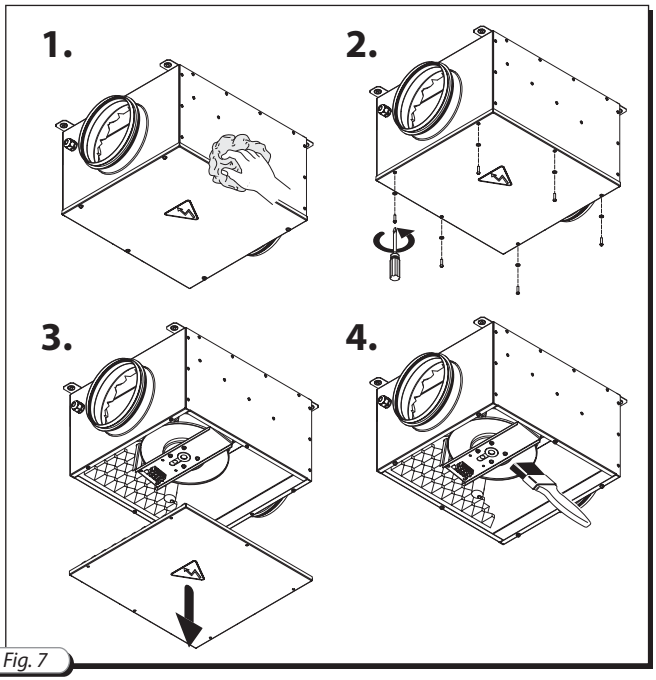


Fig. 7

TROUBLESHOOTING

Table 3

Possible Malfunctions and Their Elimination		
Problem	**Possible Reasons**	**Fault handling**
Fan will not start	The unit is not connected to the power mains.	Make sure that the unit is properly connected to the power mains and make any corrections, if necessary.
	Motor seizure.	Switch off the fan. Eliminate the reason that has caused the motor seizure. Switch on the fan again.
The automatic breaker activates upon the unit power-up	Excessive electric current consumption caused by a short circuit.	Switch off the fan. Contact the service centre.
Noise and vibration	Fan impeller clogging.	Clean the fan impeller.
	Loose screw connections.	Check the fastening screws and tighten, if necessary.

STORAGE AND TRANSPORTATION RULES

The fan must be stored in the original packing in a ventilated area at the temperature from +10 °C ai +40 °C.

The air must not contain any vapors or admixtures which may lead to corrosion or compromise the connection integrity.

Use only suitable lifting equipment for handling operations to prevent fan damage. Follow the applicable moving regulations specific to the cargo type.

The fans can be carried by any transport provided their adequate protection from atmospheric precipitation and mechanical damage. Avoid jolts and collisions while loading and unloading.

MANUFACTURER'S WARRANTY

The manufacturer hereby warrants normal fan operation over the period of 24 months from the retail sale date provided observance of the transportation, storage, installation and operation regulations. Should any malfunctions occur in the course of the fan operation through the manufacturer's fault during the warranty period the user is entitled to elimination of faults by means of warranty service performed by the manufacturer. The warranty service includes work specific to elimination of faults in the fan operation to ensure its intended use by the user within the warranty period. The faults are eliminated by means of replacement or repair of the complete fan or the faulty part of such a fan.

The warranty repair does not include:

- Routine maintenance;
- Fan installation/dismounting;
- Fan setup.

To benefit from warranty repair the user must provide the fan, the User's Manual with stamped sale date and the payment document certifying the purchase. The fan model must comply with the one stated in the User's Manual.

Contact your Seller for warranty service.

The manufacturer's warranty does not apply to the following cases:

- User's failure to provide the fan with the entire delivery package as stated in the User's Manual or with missing component parts previously dismounted by the user;
- Mismatch of the fan model and manufacturer with the respective details stated on the fan packing and in the User's Manual;
- User's failure to ensure timely technical maintenance of the fan;
- Exterior damage to the fan casing (with the exception of exterior modifications of the fan
- as required for its installation) or damaged internal components;
- Alteration of the fan design or engineering changes of the fan;
- Replacement and use of fan assemblies, parts and components not approved by the manufacturer;
- Fan misuse;
- User's violation of the fan installation regulations;
- User's violation of the fan control regulations;
- Fan connection to the power pains with a voltage different from the one stated in the User's Manual;
- Fan breakdown due to voltage surges in the power mains;
- User's discretionary repair of the fan;
- Fan repair performed by any persons without the manufacturer's authorization;
- Elapsing of the fan warranty period;
- User's violation of the established regulations specific to the fan transportation;
- User's violation of the fan storage regulations;
- Wrongful acts against the fan committed by third persons;
- Fan breakdown due to circumstances of insuperable force (fire, flood, earthquake, war, hostilities of any kind, blockade);
- Missing seals if provided by the User's Manual;
- Failure to provide the User's Manual with the sale date stamp;
- Missing payment document certifying the fan purchase.

FOLLOWING THE REGULATIONS STIPULATED HEREIN WILL ENSURE A LONG AND TROUBLE-FREE OPERATION OF THE FAN.
USERS' CLAIMS SHALL BE SUBJECT TO REVIEW ONLY UPON PRESENTATION OF THE FAN, THE PAYMENT DOCUMENT AND THE USER'S MANUAL WITH THE SALE DATE STAMP.

ACCEPTANCE CERTIFICATE

Product Type	Sound-Insulated Fan
Model	VENTS KSB_____
Serial Number	
Manufacturing Date	
The fan is recognized as serviceable.	
Quality Inspector's Stamp	

SELLER INFORMATION

Shop name	
Address	
Phone Number	
E-mail	
Sale date	

Seller stamp here

This is to certify delivery of the complete fan with the User's Manual. The warranty terms and service centre list are acknowledged and accepted.	
Customer signature	

MOUNTING CERTIFICATE

VENTS KSB _____ Sound-Insulated fan has been installed and connected to the power mains in accordance with the provisions stated herein.	
Company Name	
Address	
Phone Number	
Installation Technician's Full Name	
Mounting date	**Signature:**

Installer stamp here

This is to certify that the work specific to the fan installation has been performed in accordance with all the applicable provisions of local and national construction, electrical and technical codes and standards. The fan operates normally as intended by the manufacturer.
Signature:

WARRANTY CARD

Product Type	Sound-Insulated Fan
Model	VENTS KSB_____
Serial Number	
Manufacturing Date	
Sale date	
Warranty Period	
Selling Company	

Seller Stamp here